

CLAIMS

1. A process for producing lipids containing arachidonic acid comprising the steps of

5 culturing a microorganism in which  $\omega$ 3  
desaturase activity has been decreased or is lacking at a  
temperature lower than the optimum growth temperature  
from the start of culturing or after culturing at the  
optimum growth temperature, said microorganism being  
obtained by mutagenesis of a microorganism capable of  
10 producing arachidonic acid and belonging to the genus  
Mortierella, the genus Conidiobolus, the genus Pythium,  
the genus Phytophthora, the genus Penicillium, the genus  
Cladosporium, the genus Mucor, the genus Fusarium, the  
genus Aspergillus, the genus Rhodotorula, the genus  
15 Entomophthora, the genus Echinosporangium or the genus  
Saprolegnia; and then

recovering lipids containing arachidonic acid from the culture.

2. The process for producing lipids containing arachidonic acid according to claim 1 comprising  
20 culturing said mutant strain in a medium containing  
hydrocarbons, fatty acids, fatty acid esters, fatty acid  
salts, or lipids containing them as components; or adding  
to the culture in which said mutant strain is being  
25 cultured hydrocarbons, fatty acids, fatty acid esters,  
fatty acid salts, or lipids containing them as  
components, and then further culturing.

3. A process for producing lipids containing arachidonic acid comprising the steps of

30 culturing a microorganism in which  $\omega$ 3  
desaturase activity has been decreased or is lacking at a  
temperature lower than 20°C from the start of culturing  
or after culturing at 20 to 40°C, said microorganism  
being obtained by the mutagenesis of a microorganism  
35 belonging to the subgenus Mortierella; and then

recovering lipids containing arachidonic

acid from the culture.

4. The method of producing lipids containing arachidonic acid according to claim 3 comprising culturing said mutant strain in a medium containing hydrocarbons, fatty acids, fatty acid esters, fatty acid salts, or lipids containing them as components; or adding to the culture in which said mutant strain is being cultured hydrocarbons, fatty acids, fatty acid esters, fatty acid salts, or lipids containing them as components, and then further culturing.

5. A method of producing lipids containing dihomog-linolenic acid comprising the steps of

culturing a microorganism in which  $\omega 3$  desaturase activity has been decreased or is lacking at a temperature lower than the optimum growth temperature from the start of culturing or after culturing at the optimum growth temperature, said microorganism being obtained by the mutagenesis of a microorganism capable of producing arachidonic acid and belonging to the genus Mortierella, the genus Conidiobolus, the genus Pythium, the genus Phytophthora, the genus Penicillium, the genus Cladosporium, the genus Mucor, the genus Fusarium, the genus Aspergillus, the genus Rhodotorula, the genus Entomophthora, the genus Echinosporangium or the genus Saprolegnia; and then

recovering lipids containing dihomog-linolenic acid from the culture.

6. The method of producing lipids containing dihomog-linolenic acid according to claim 5 wherein said mutant strain is a mutant strain in which further  $\Delta 5$  desaturase activity has been decreased or is lacking.

7. The method of producing lipids containing dihomog-linolenic acid according to claim 5 or 6 comprising culturing said mutant strain in a medium containing hydrocarbons, fatty acids, fatty acid esters,

fatty acid salts, or lipids containing them as components; or adding to the culture in which said mutant strain is being cultured hydrocarbons, fatty acids, fatty acid esters, fatty acid salts, or lipids containing them as components, and then further culturing.

8. A method of producing lipids containing dihomog-linolenic acid comprising the steps of

culturing a microorganism in which  $\omega 3$  desaturase activity has been decreased or is lacking at a temperature lower than 20°C from the start of culturing or after culturing at 20 to 40°C, said microorganism being obtained by the mutagenesis of a microorganism belonging to the subgenus Mortierella; and then recovering lipids containing dihomog-linolenic acid from the culture.

9. The method of producing lipids containing dihomog-linolenic acid according to claim 8 wherein said mutant strain is a mutant strain in which further  $\Delta 5$  desaturase activity has been decreased or is lacking.

10. The method of producing lipids containing dihomog-linolenic acid according to claim 8 or 9 comprising culturing said mutant strain in a medium containing hydrocarbons, fatty acids, fatty acid esters, fatty acid salts, or lipids containing them as components; or adding to the culture in which said mutant strain is being cultured hydrocarbons, fatty acids, fatty acid esters, fatty acid salts, or lipids containing them as components, and then further culturing.

11. An arachidonic acid-containing microbial lipid containing 72% by weight or more of arachidonic acid to the total fatty acids in said lipid.

12. The arachidonic acid-containing microbial lipid according to claim 11 wherein the percentage of eicosapentaenoic acid to the total fatty acids in said lipid is 0.5% by weight or less.

13. A microorganism wherein  $\omega$ 3 desaturase activity has been decreased or is lacking, said microorganism being obtained by the mutagenesis of a microorganism capable of producing arachidonic acid and belonging to the genus Mortierella, the genus Conidiobolus, the genus Pythium, the genus Phytophthora, the genus Penicillium, the genus Cladosporium, the genus Mucor, the genus Fusarium, the genus Aspergillus, the genus Rhodotorula, the genus Entomophthora, the genus Echinosporangium or the genus Saprolegnia.

14. The microorganism according to claim 13 wherein  $\omega$ 3 desaturase activity has been decreased or is lacking, wherein said microorganism capable of producing arachidonic acid that is subjected to mutagenesis is a microorganism belonging to the genus Mortierella subgenus Mortierella.

15. The microorganism according to claim 14 wherein  $\omega$ 3 desaturase activity has been decreased or is lacking, wherein said microorganism, capable of producing arachidonic acid, that is subjected to mutagenesis is Mortierella alpina.

16. The microorganism according to claim 15 wherein  $\omega$ 3 desaturase activity has been decreased or is lacking, wherein said microorganism wherein  $\omega$ 3 desaturase activity has been decreased or lacked is Mortierella alpina SAM2153 (FERM BP-6794).

17. A lipid containing arachidonic acid wherein the arachidonic acid content in the total fatty acids in the lipid is 50% by weight or more, said lipid being obtained by culturing a microorganism according to any one of claims 13 to 16 in which  $\omega$ 3 desaturase activity has been decreased or is lacking.

18. A lipid containing arachidonic acid in which the arachidonic acid content in the total fatty acids in the lipid is 50% by weight or more and the

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eicosapentaenoic acid content is 0.5% by weight or less, said lipid being obtained by culturing a microorganism according to ~~any one of claims 13 to 16~~ in which  $\omega$ 3 desaturase activity has been decreased or is lacking.

*5*  
19. A lipid containing arachidonic acid according to claim 17 ~~or 18~~ wherein the arachidonic acid content in the total fatty acids in the lipid is 60% by weight or more.

*10*  
20. A lipid containing arachidonic acid according to claim 17 ~~or 18~~ wherein the arachidonic acid content in the total fatty acids in the lipid is 70% by weight or more.

*add a'*

*add C3*

*add B2*